In the claims:

1-22. (cancelled).

23. (currently amended) A method of modifying the electrophysiological function of an excitable tissue region of an individual, the method comprising:

(a) providing cells expressing ~~at least one~~an exogenous polypeptide forming a functional ion channel or transporter~~and at least one polypeptide forming gap junctions~~; and

(b) implanting said cells into the excitable tissue region, such that each implanted cell forms:

(i) gap junctions with at least one cell of the excitable tissue region; and

(ii) a functional ion channel or transporter;

thereby modifying the electrophysiological function of the excitable tissue region.

24. (original) The method of claim 23, wherein said ion channel is selected from the group consisting of a sodium ion channel, a potassium ion channel, a calcium ion channel and a chloride ion channel.

25-26. (cancelled).

27. (currently amended) The method of claim ~~38~~23, wherein expression of ~~each of said at least one polypeptide from said exogenous polynucleotide~~ said exogenous polypeptide is regulatable by an endogenous or an exogenous factor.

28. (original) The method of claim 23, wherein an ion permeability of said functional ion channel is regulatable by an endogenous or an exogenous factor.

29. (original) The method of claim 23, further comprising the step of regulating permeability of said functional ion channel or an activity of said transporter to thereby regulate the electrophysiological function of the excitable tissue region.

30. (currently amended) The method of claim 29, wherein said step of regulating said permeability is effected by administering ~~said~~ an exogenous factor to the excitable tissue region.

31. (previously presented) The method of claim 23, wherein each implanted cell forms said functional ion channel or transporter following induction.

32. (original) The method of claim 23, wherein the excitable tissue region forms a part of an organ selected from the group consisting of a heart, a pancreas, a kidney, a brain, a smooth muscle, a skeletal muscle and a liver.

33. (original) The method of claim 23, wherein the method is utilized for regulating cardiac arrhythmia.

34. (original) The method of claim 23, wherein the method is utilized for regulating secretion of endogenous factors from an organ including the excitable tissue region of the individual.

35. (original) The method of claim 23, wherein the method is utilized for regulating neuronal discharge.

36-39. (cancelled)